Listing of Claims

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1. (Previously presented) An electric motor monitoring system comprising an antenna and a processor; the antenna detecting radio-frequency signals generated by arcing events in the electric motor; and the processor processing the radio-frequency signals generated by the arcing events in the electric motor so as to determine one or more operational parameters of the electric motor.

2. (Previously presented) An electric motor monitoring system as claimed in Claim 1 wherein the antenna comprises a means for screening background noise so improving the overall signal to noise ratio of the electric motor monitoring system.

3. (Previously presented) An electric motor monitoring system as claimed in Claim 1 wherein the antenna further comprises a frequency matching unit such that the frequency matching unit allows the antenna to be frequency tuned so as to optimize its operation with the electric motor.

4. (Previously presented) An electric motor monitoring system as claimed in Claim 3 wherein the frequency matching unit comprises a signal conditioning unit.

5. (Previously presented) An electric motor monitoring system as claimed in Claim 1 wherein the antenna comprises a balanced Faraday screened loop antenna.

6. (Previously presented) An electric motor monitoring system as claimed in claim 1 wherein the antenna comprises an unbalanced Faraday screened loop antenna.

7. (Previously presented) An electric motor monitoring system as claimed in Claim 1 wherein the antenna comprises an electric field probe or a magnetic field probe.

8. (Previously presented) An electric motor monitoring system as claimed in Claim 1 wherein the processor comprises an anti aliasing filter, an analogue to digital converter and a high speed PCI card such that the processor allows the radio-frequency signals, over a predetermined length of time, to be captured.

9. (Canceled)

10. (Previously presented) An antenna for measuring high frequency radio frequency signals associated with arcing events from a brush contact in an electric motor, the antenna comprising a loop and a loop screen, wherein the loop comprises a conductor and a screened coaxial cable such that the conductor is turned back on itself so as to form one or more turns while the end of the conductor cable is attached to the screen of the coaxial cable and the loop screen shields the loop from background noise thus improving the signal to noise ratio of the signal detected by the antenna.

11. (Previously presented) An antenna as claimed in Claim 10 wherein the loop screen physically covers all but a small detection section of the loop.

12. (Previously presented) An antenna as claimed in Claim 10 wherein the antenna further comprises a frequency matching unit such that the frequency matching unit allows the antenna to be frequency tuned so as to optimize the antenna's operation with the electric motor.

13. (Previously presented) An antenna as claimed in Claim 12 wherein the frequency matching unit comprises a signal conditioning unit.

14. (Canceled)

15. (Previously presented) A method for monitoring an electric motor, the method comprising the steps of:

i) Detecting radio frequency signals generated by arcing events in the electric motor;

ii) Processing the radio-frequency signals generated by the arcing events in the electric motor so as to determine one or more operational parameters of the electric motor.

16. (Previously presented) A method as claimed in Claim 15 comprises the additional step of associating the frequency of the radio frequency signal to individual components of the electric motor.

17. (Previously presented) A method as claimed in Claim 15 wherein the detection of the radio frequency signals employs a non-intrusive antenna.

18. (Previously presented) A method as claimed in Claim 15 wherein for the step of processing the radio frequency signals comprises monitoring frequency modulation and amplitude modulation within the radio frequency signals.

19. (Previously presented) A method as claimed in Claim 15 wherein processing the radio frequency signals comprises the application of Fast Fourier Transformations so as to convert the radio frequency signals to interpretable frequency spectra.

20. (Previously presented) A method as claimed in Claim 15 wherein the processing the radio frequency signals comprises the application of Digital Signal Processing techniques to the sampled data so as to convert the sampled data to interpretable frequency spectra.

21. (Previously presented) A method as claimed in Claim 20 wherein the Digital Signal Processing techniques comprise Wavelet Analysis.

22. (Previously presented) A method as claimed in Claim 19 wherein the interpretable frequency spectra comprise frequency features that can be directly associated with one or more components of the electric motor.

23. (Previously presented) A method as claimed in Claim 19 wherein the interpretable frequency spectra comprise frequency features that can be directly associated with one or more faults in the electric motor.

24. (Previously presented) A method as claimed in Claim 15 wherein processing the radio frequency signals comprises calculating an average width of the radio frequency signals, above a predetermined level, over a number of arcing events.

25. (Previously presented) A method as claimed in Claim 15 wherein processing the radio frequency signals comprises calculating an average height of the radio frequency signals over a number of arcing events.

26. (Previously presented) A method as claimed in Claim 15 wherein processing the radio frequency signals comprises calculating an average ratio of the width and height of the radio frequency signals over a number of arcing events.

27. (Previously presented) A method as claimed in Claim 15 comprising the additional step of self-calibration of the method.

28. (Previously presented) A method as claimed in Claim 27 wherein the self-calibration of the method comprises a current measuring technique including the sub-steps of:

i) Measuring the torque on the electric motor by employing the non-intrusive antenna;

ii) Measuring directly the current in the electric motor so as to enable the torque on the electric motor to be calculated;

iii) Taking the difference between the two methods for obtaining the value of the torque on the electric motor so providing a compensation factor; and

iv) Adding the compensation factor to the non-intrusive antenna method for measuring the torque on the electric motor.

29. (Previously presented)An electric motor monitoring system as claimed in Claim 1 wherein the processor determines the speed or torque of the electric.motor.

30. (Previously presented)An electric motor monitoring system as claimed in Claim 1 wherein the processor relates the arcing events with one or more components of the electric motor.

31. (Previously presented)An electric motor monitoring system as claimed in Claim 1 wherein the processor determines a physical location within the electric motor according to the arcing events.

32. (Previously presented)An electric motor monitoring system as claimed in Claim 1 wherein the processor determines one or more faults in the electric motor.

33. (Previously presented)An electric motor monitoring system as claimed in Claim 1 wherein the processor determines variations in the operational parameters of the electric motor.

34. (Previously presented)An electric motor monitoring system as claimed in Claim 1 wherein the processor performs a fast Fourier Transform on the radio-frequency signals.

35. (Previously presented)An electric motor monitoring system as claimed in Claim 1 wherein the processor comprises a computer processor capable of manipulating and storing data corresponding to the radio-frequency signals.

36. (Previously presented)A method as claimed in Claim 15 wherein determining one or more operational parameters of the electric motor comprises determining the speed or torque of the electric motor.

37. (Previously presented)A method as claimed in Claim 15 wherein determining one or more operational parameters of the electric motor comprises relating the arcing events with one or more components of the electric motor.

38. (Previously presented)A method as claimed in Claim 15 comprises the additional step of relating the arcing events to a physical location within the electric motor.

39. (Previously presented)A method as claimed in Claim 20 comprising the additional step of determining one or more faults in the electric motor.

40. (Previously presented)A method as claimed in Claim 20 comprising the additional step of determining variations in the operational parameters of the electric motor.